

among lemurs, insectivora, carnivora. But the feature of this reptilian type is its generalised mammalian resemblances in dental characteristics, which are highly specialised distinctions among mammals, so that the teeth have undergone an evolution of mammalian type. It is not to be anticipated that a complete skeleton of *Diademodon* will make a closer approximation to that of a mammal than is already evidenced by other Theriodont reptiles; but the dental characters emphasise the mammalian approximations which have been found in the shoulder-girdle, pelvic arch, and limb-bones.

I propose to distinguish this species, characterised by the median ridge on the palate, the ovate unworn multituberculate crowns of the middle molars, the moderate interspace between the orbits, and slender snout rounded above, as *Diademodon entomophonus*. The absence of wear to the crowns is only consistent with a diet which did not involve trituration. It is in contrast with the condition in *Diademodon browni*, which it approximates in general characters.

## 6. New Siphonaptera.

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(Plates XXVIII.-XXXI. \*)

### Genus PYGIOPSYLLA.

*Pygiopsylla* Rothschild, Ent. Mon. Mag. (2) xvii. p. 221 (1906)  
(type: *hilli*).

The species belonging to this genus are easily distinguished from *Ceratophyllus* Curtis (type of name: *hirundinis*) by the sensory plate (so-called pygidium) of the ninth abdominal tergite being strongly convex (*cf.* Pl. XXX. fig. 14). All the species are very hairy. They are inhabitants of the Old World, being known both from the Oriental and Æthiopian Regions. Nine species are known, namely: *hilli* Rothschild (1904), *novæ-guinæe* Rothschild (1904), *robinsoni* Rothschild (1905), *colossus* Rothschild (1906), *echidnæ* Denny (1843), *ahale* Rothschild (1904), *torvus* Rothschild (1908), *woodwardi* Rothschild (1904), and *rothschildi* Rainb. (1905), the last two appearing to me to be but doubtfully distinct from each other. In the present paper six more species are described—namely, two from Australia, two from New Guinea, one from Ceylon, and one from West Africa (Angola),—making in all 15 species of this genus. The wide distribution of the genus renders it probable that these fifteen forms are only a small percentage of the actually existing species of *Pygiopsylla*.

\* For explanation of the Plates, see p. 629.

*P. echidnæ* is a more specialised species than the others. The genal edge of the head is produced into a broad tooth-like lobe, corresponding to the lobe found in the *Sarcopsyllidæ* and in *Pariodontis* Rothschild (1908) and *Lycopsylla* Rothschild (1904), and the comb of the pronotum is reduced to a few spines (4 to 6), which are dorsal. The head of *P. echidnæ*, moreover, is short, bearing two regular rows of three bristles each on the frons, there being no row of small bristles between the anterior corner of the frons and the base of the antennal groove, as is the case in all the other species of *Pygiopsylla* (cf. Pl. XXIX. fig. 7). It may possibly become necessary to move *echidnæ* from *Pygiopsylla* and place it in a new genus. For the present, however, there is no necessity for this change.

1. PYGIOPSYLLA AFER, sp. n. (Plate XXIX. figs. 7, 8.)

**Head.**—The head (Pl. XXIX. fig. 7) is gradually rounded, the lower part of the frons not being curved backwards (*i. e.* towards the fore coxæ). The rostrum does not quite reach the apex of the fore coxa.

**Thorax.**—The pronotum bears a comb of 23 spines and two rows of bristles. On the mesonotum there are 4 rows of bristles, the anterior row being abbreviated and there being also some dorsal bristles in front of this row. The mesopleura have 8 long bristles and a few short ones. The metanotum bears 4 rows of bristles, the first row consisting of but a few bristles situated on the back. The epimerum of the mesothorax bears an irregular anterior row of 7 or 8 bristles, a central row of 3, and a posterior row of 3 or 4 long and some short bristles.

**Abdomen.**—The first tergite is practically hairy all over. The other tergites bear 4 rows of bristles, the first row being represented only by a few bristles on the fifth to seventh segments. There is a stout apical spine on each side of tergites 2 to 5. The basal sternite bears an oblique patch of short bristles on the side, consisting of 3 irregular rows. On the sternites of the third to seventh segments there is a subapical row of 4 or 5 long bristles, proximally to which are numerous small bristles.

**Legs.**—The mid and hind femora bear on the outer side three subapical ventral hairs, which are of nearly equal size, there being no other ventral hairs between these three and the widest point of the femora. The hind tibia bears about 20 bristles on the outside, arranged in three irregular rows, besides a number of smaller bristles situated at and near the anterior edge of the tibia. The first fore-tarsal segment is longer than the second and has four thin and long bristles on the hinder side. The first mid-tarsal segment is much longer than the second. The hind tarsus is long, especially the first and second segments, the third segment being longer than the fifth. The first and third pairs of lateral bristles of the fifth segment are moved towards the mesial line, especially in the fore and mid tarsi.

**Modified segments.**—The seventh abdominal sternite has a deep triangular sinus (Pl. XXIX. fig. 8), the upper lobe being broad, but tapering to a point. The bristles on the eighth tergite are more numerous than in *P. robinsoni*, to which the present species is allied. At the apical margin of this segment, there is one long bristle, and above it are situated two short ones and beneath it one moderately long one. There is a row of 5 or 6 long bristles along the ventral edge, the most distal bristle being the longest of all. Above this bristle there are two more long ones, and further proximad about 16 short ones. The anal sternite is rounded beneath near the base, bearing on this rounded portion a row of 4 bristles on each side, there being a further pair of bristles on each side close to the apex.

Length: 3.6 mm.

One ♀ from Benguella, Angola, 200 miles from the coast, found at an altitude of 4780 ft. by Dr. F. Creighton Wellman the host not being stated; received from Mr. Oldfield Thomas, F.R.S.

2. *PYGIOPSYLLA RAINBOWI*, sp. n. (Plate XXVIII. fig. 5; Plate XXX. fig. 13.)

The present species apparently agrees in all details, except the modified abdominal segments, with *P. colossus* Rothschild 1906, of which only one ♀ is known.

♂. The small eighth tergite bears about 8 short bristles above the stigma. The eighth sternite (Pl. XXX. fig. 13), on the other hand, is very large, being covered with numerous bristles, of which those placed near the dorsal and apical edges are longest and thickest. The ventral margin of this segment (in lateral view) is incurved twice, the segment being incised in the mesial line from the apex to the point where the ventral margin bulges out. The clasper (Cl.) is distally produced into a thumb-like process, which is shorter than the pointed and slightly curved movable process (F). The manubrium (M) is triangular, ending in a short process. The vertical arm of the ninth sternite (IX. st.) is club-shaped, and at the apex truncate, with the distal margin of the widened portion rounded. The horizontal arm is of nearly even width, its upper margin being twice incurved. This arm bears numerous small hairs on the apical as well as proximal portions, there being in addition on each side a row of five ventral bristles, of which the most proximal one is the longest and thickest. The penis ends in a short and sharp hook, which points downwards. The anal tergite (X. t.) is triangular in side-view, being about twice as long as it is broad at the base. The tenth sternite is much slenderer than the tergite, bearing two long apical bristles on each side.—

♀. The apical margin of the seventh abdominal sternite is rounded, being ventrally obliquely truncate and bearing a small sinus in the centre (Pl. XXVIII. fig. 5). The eighth sternite has fewer bristles than in *P. colossus* at and near the apical and

ventral margins. The ninth and tenth segments resemble those of *P. colossus*.

Length: ♂ 3.3 mm., ♀ 5 mm.

We have a long series off *Mus assimilis* from Emerald, Victoria, Australia, collected by Mr. Edw. Jarvis during 1907.

### 3. PYGIOPSYLLA GRAVIS, sp. n. (Plate XXX. fig. 14.)

This species closely resembles *P. rainbowi*, except in the genitalia. We have only one ♂.

♂. The eighth abdominal sternite (Pl. XXX. fig. 14) is very large, as it is in *rainbowi*, and is densely covered with bristles as in that species. But the long bristles which are placed along the apical and dorsal edges of the segment are more numerous and more slender than in *rainbowi*. The upper margin of the eighth sternite is gradually rounded, the ventral margin being straight. The clasper (Pl. XXX. fig. 14, Cl.) is distally produced into a finger-like process (P), which bears a row of thin hairs at the dorsal margin. The movable flap (F) is very large, being leaf-shaped, with the pointed tip curved upwards. The manubrium (M) is curved dorsad, the apical portion being somewhat twisted. The ninth sternite (Pl. XXX. fig. 14, IX. st.) is very broad. The horizontal arm bears ventrally at the apex on each side five long stout spines, of which the most distal one is the longest. The anal segment (= tenth) is long and slender, the anal sternite bearing a pair of very long bristles at the apex.

Length: ♂ 4 mm.

We have one ♂ from Emerald, Victoria, off *Mus assimilis*, collected on 18th September, 1906, by Mr. Edw. Jarvis.

### 4. PYGIOPSYLLA LACINIOSUS, sp. n. (Plate XXIX. fig. 10.)

♀. As large as *P. rainbowi*.

**Thorax.**—The pronotum bears two rows of bristles and a comb of 19 spines. The pleura of the mesothorax have 7 or 8 bristles, while the mesonotum bears four rows of bristles and some additional ones in front of these rows on the back. The metanotum has likewise four rows of bristles, but the first row contains on each side only about 5 bristles, and there are dorsally fewer hairs in front of this row than on the mesonotum. The epimerum of the metathorax has four irregular rows of bristles (5, 5, 2 or 3, 3), the bristles of the posterior row being the longest. There are also one or two additional short bristles in front of the posterior row.

**Abdomen.**—The first tergite is hairy all over. The other tergites bear fewer bristles than in *P. rainbowi* and *colossus*, the second and third having four rows and some additional dorsal bristles, while the sixth and seventh tergites bear three rows and a few bristles representing a fourth row; the basal sternite has no bristles on the sides, apart from a few extremely small hairs.

The short bristles on the sternites of the third to sixth segments are less numerous than in the allied species just mentioned.

**Legs.**—As in *colossus*.

**Modified segments.**—♀. The seventh sternite (Pl. XXIX. fig. 10) is bisinuate, closely resembling that segment of *P. colossus*, but differing in the lower lobe and the lower sinus being much wider, in the upper sinus being smaller, and in the bristles being differently arranged.

Length : 5 mm.

We have 3 ♀ from Mt. Albert Edward, British New Guinea, off *Mus mordax*; received from Mr. E. C. Chubb.

5. PYGIOPSYLLA MORDAX, sp. n. (Plate XXVIII. fig. 6; Plate XXIX. fig. 9.)

**Head.**—The frons is strongly curved, as is the case in *P. ahalæ* Rothsch. (1904), the bristles being thick. The rostrum is shorter than in all the other species, reaching only a little beyond the middle of the fore coxa.

**Thorax.**—The pronotum is short. It bears two rows of bristles, the anterior row being irregular and represented by but a few dorsal hairs. The comb consists of 16 to 18 spines, which are longer than the pronotum. The meso- and metanotum each bears four rows of bristles, the first row not reaching so far downward as the others. The mesothoracic pleura have about twelve bristles, of which four or five anterior ones are short.

**Abdomen.**—The first tergite has four rows of bristles, the second to seventh tergites three rows. The basal sternite bears in the ♂ about 6 minute hairs on the side arranged in two oblique rows. The sternites of the third to sixth segments of the ♂ have on each side a curved row of four subapical bristles and proximately to this row six or eight smaller bristles. In the ♀ the basal sternite has two irregular oblique rows of bristles on the side, each row containing about ten bristles, the bristles being more numerous also on the other sternites than in the ♂.

**Legs.**—The mid and hind femora bear three ventral subapical bristles, the first being smaller than the others. The mid and hind tibiæ have numerous bristles practically all over the outer surface, the bristles being more numerous in the ♀ than in the ♂. The first mid-tarsal segment is much longer than the second, but is shorter than in *P. ahalæ*. The fifth hind-tarsal segment is as long as the third.

**Modified segments.**—♂. The apex of the large eighth abdominal sternite is irregularly rounded. There are four pairs of long bristles below the upper edge of this sclerite, a single long bristle below the most distal pair, and further down at the ventral margin two or three more long bristles. Between these long ventral bristles and the base of the segment there are about 12 shorter bristles, there being also three or four additional bristles on the lateral surface. The clasper (Pl. XXVIII. fig. 6, Cl.) is distally

truncate-emarginate, the lower corner being somewhat produced and bearing a long thin bristle accompanied by a small one. The manubrium (M) is very broad, the apex being pointed and curved dorsad. The movable process (F) is very long. It is pointed and curved, its upper edge being twice incurved. There is a large number of bristles at the ventral margin of this process, the distal ones being long. The vertical arm of the ninth tergite (Pl. XXVIII. fig. 6, IX. st.) is almost evenly curved. The horizontal arm is shorter than the vertical one and bears two strong spines ventrally at the apex, there being also a number of thin bristles along the ventral margin and at the apex, as shown in the figure.—♀. The seventh sternite is deeply sinuate, the upper lobe being broad and the lower one narrow (Pl. XXIX. fig. 9). The eighth tergite bears on each side three or four small bristles above the stigma. On the ventral portion of this sclerite there are about twenty bristles, three or four placed at the apical margin and five along the ventral edge. The lower apical angle of the eighth tergite is produced. The anal sternite has on each side two long bristles near the base, one in the centre and one near the apex, besides two smaller apical ones.

Length: ♂ ♀ 2.1 mm.

We have one ♂ and two ♀ from Mt. Albert Edward, British New Guinea, off *Mus mordax*; received from Mr. E. C. Chubb.

#### 6. PYGIOPSYLLA FERINUS, sp. n. (Plate XXIX. fig. 11.)

Nearest to *P. mordax*.

**Head.**—The rostrum reaches nearly to the apex of the fore coxa. The bristles of the anterior row of the frons are a little thicker than in *P. mordax*.

**Thorax.**—The pronotum has one row of bristles and a comb of 17 spines. The meso- and metanota have three rows of bristles, a fourth (anterior) row being represented by a few short dorsal bristles only. The epimerum of the metathorax has ten bristles (4, 3, 3), with some small hairs in between the posterior bristles.

**Abdomen.**—The tergites have three rows of bristles, the anterior row being represented by but few bristles, except in the case of the first segment, which bears about four additional bristles on the two sides together, representing a more complete fourth row. The bristles on the sternites are less numerous than in *P. mordax*.

**Modified segments.**—♀. The seventh sternite (Pl. XXIX. fig. 11) is bisinuate, the upper sinus being smaller than the lower. The eighth segment is similar to that of *P. mordax*. The anal sternite, however, is quite different. This sclerite has beneath a prominent tubercle bearing a brush of long bristles.

Length: ♀ 3 mm.

We have one ♀ from Pundaloya, Ceylon, taken off *Sorex* sp by Mr. E. E. Green.

7. *STEPHANOCIRCUS JARVISI*, sp. n. (Plate XXIX. fig. 12; Plate XXXI. fig. 16.)

**Head.**—The helmet is rounded, resembling that of *S. simsoni* Roths. (1905), but being broader and bearing on each side 17 or 18 spines. The genal comb consists of 11 or 12 spines, which are obtuse, like those of the helmet, not being pointed as in *S. dasypuri* Skuse (1890). The occiput is shorter than in all the other species, its bristles being thick. The mouth-parts are short, the maxillary palpus as well as the rostrum being only twice the length of the spines of the genal comb. The last segment of the rostrum is broader than it is long. The maxilla is pointed.

**Thorax.**—The pronotum bears a comb of 30 to 40 spines and two regular rows of thick bristles. The mesonotum has about 7 rows of bristles, the anterior bristles being small. On the pleura of the mesothorax there are about 24 bristles, some being short. The metanotum has three rows of bristles and in front of them a few additional shorter hairs. The episternum of the metathorax bears about 6 bristles, while the epimerum has two rows, the first being irregular and containing 6 or 7 bristles and the second containing 5.

**Abdomen.**—The abdominal tergites 1 to 7 bear each two rows of bristles, the seventh tergite having 2 apical bristles in the male, and 4 of nearly equal size in the female. On the first tergite there is a comb of 27 spines in the ♂, which are only a little shorter than those of the pronotal comb, the comb of the ♀ containing 34 spines; the second tergite has a comb of 17 shorter spines in the ♂ and of 22 in the ♀, the comb of the third tergite consisting of 15 spines in both sexes. The fourth tergite bears on each side 2 or 3 shorter and paler apical spines and the fifth and sixth tergite one spine.

**Legs.**—Resembling most those of *S. mars*. The hind coxa is longer than in that species. The hind femur bears posteriorly 3 subventral bristles and between these and the dorsal edge several more bristles, there being also one or two bristles near the base on the outer surface. The tibiæ are very characteristic. In the fore and mid tibiæ the outer bristles of the dorsal pairs are shifted towards the lateral surface, forming a close-set row of thick and equal-sized bristles. In the hind tibia these bristles are in their normal position close to the long dorsal bristles. The dorsal bristles are very long, the fifth being of the length of the tibia. The hind tibia bears numerous bristles scattered over the outer surface. The first mid-tarsal segment is twice the length of the second. The first hind-tarsal segment is only one-sixth shorter than the hind tibia, its longest apical bristle nearly reaching to the tip of the second segment, which latter is twice the length of the fifth segment (claws excluded).

**Modified segments.**—♂. The clasper (Pl. XXIX. fig. 12, Cl.) is produced into a broad, leaf-shaped apical lobe, which bears three large bristles placed on the lateral surface. A number of small

bristles are situated along the dorsal edge of this lobe, while two fairly long ones are placed just beneath the pointed apex of the lobe. The clasper, moreover, is ventrally widened into an obtuse triangular lobe, which bears one slender bristle. The finger (F) is asymmetrical, being leaf-shaped with the apex curving upwards, bearing two moderately long bristles below the apex and a few still shorter ones further proximad. The manubrium (M) curves upwards, the ventral margin bulging out in the centre. The ninth sternite (Pl. XXIX. fig. 12, IX. st.) resembles that of *S. simsoni* in general structure, but the inner arm is different in outline, the horizontal arm is longer, and the number, size, and position of the bristles are different. There are, as in *S. simsoni* and *dasyuri*, two apical spines on each side of the horizontal arm of the ninth sternite, as shown in the figure. The anal tergite is very different from that of *S. simsoni*, bearing a few thin bristles and on each side a pair of long apical ones. The anal sternite is divided at the apex, each lobe bearing three long bristles.—♀. The eighth tergite, which resembles in outline that sclerite of *S. simsoni*, bears about 9 short but strong bristles above the stigma, and from 29 to 34 bristles on the sides and at the apex, as shown in the figure (Pl. XXXI. fig. 16). The eighth sternite is elongate-triangular, ending in a long sharp point as in *S. simsoni*. The tenth tergite is distinctly separated from the ninth tergite, as is also the case in *S. simsoni*. Proximally to this suture there is a transverse row of bristles on the ninth tergite. The stylet is very long.

Length: ♂ 2.7 mm., ♀ 3.3 mm.

We have examined a pair of this species, the ♂ (the type) from Emerald, Victoria, found under a rotten tree-trunk in the virgin forest by Mr. Edw. Jarvis; the ♀, from Victoria, off *Phascogale swainsoni*, was forwarded to us by Mr. D. McAlpine.

#### 8. CTENOPHTHALMUS RETTIGI, sp. n. (Plate XXVIII. figs. 3, 4.)

Similar to *C. agyrtes*, but differing especially in the bristles of the abdomen and in the modified abdominal segments.

**Thorax.**—The comb of the pronotum consists of 18 spines.

**Abdomen.**—The bristles are longer than in *C. agyrtes*, especially the three apical ones of the seventh tergite. The sternites of segments three to seven in the ♂ have a transverse row of 4 or 5 bristles and generally some small bristles in front of this row. The basal sternite in the ♀ has two or more bristles on the side; the following four sternites have a row of 6 or 7 bristles and from 6 to 10 smaller ones in front of the row; on the seventh sternite the row contains about 10 long bristles.

**Modified segments.**—♂. The eighth tergite (Pl. XXVIII. fig. 3) has about 6 small bristles above the stigma. The sternite becomes gradually narrower towards the apex, which is truncate; it bears on its lower portion 14 or 16 bristles (Pl. XXVIII. fig. 3). The



clasper (Pl. XXVIII. fig. 3, Cl.) is produced into a short square process (P), of which the apical margin is feebly incurved. At the upper corner of this process there are about half-a-dozen slender bristles and one which is very stout and long, whereas at the oblique ventral margin of the process there are two such long bristles. The manubrium (M) gradually tapers to a point, being somewhat curved upwards. The movable process (F) is widest near the base. It is irregularly conical, the ventral margin being somewhat incurved and proximally strongly rounded. There are four short broad bristles near its apex at the dorsal edge and three thin ones near the apex at the ventral margin, there being, moreover, four thin bristles at this margin on the widest part towards the base. The horizontal arm of the ninth sternite (IX. st.) is much shorter than the vertical arm. There are about 17 bristles at and near the ventral margin of this sternite from before the middle to the apex, the four or five proximal bristles being close together and longer than the sternite is broad.—♀. The apical margin of the seventh sternite is sinuate below the centre, the upper lobe being very broad and nearly square (Pl. XXVIII. fig. 4), while the lower lobe is small and obliquely rounded. The eighth tergite bears several small bristles above the stigma and about 16 bristles on the lower portion, there being also ten or more small bristles near the apex on the inner surface. The stylet is nearly three times as long as it is broad at the base.

Length: ♂ 2.1 mm., ♀ 3.2 mm.

We have a large series collected by Mr. A. Rettig at Malcoci, Roumania, off *Mesocricetus newtoni*, *Putorius desertorum*, and *Spalax typhlus*.

9. CTENOPSYLLUS ALLOPHYLUS, sp. n. (Plate XXVIII. figs. 1, 2.)

**Head.**—The frons (Pl. XXVIII. fig. 2) is strongly and evenly rounded and bears a vertical comb of 6 spines. The first spine is short and very broad, while the third is placed beneath the second and fourth. There is anteriorly a row of 8 bristles, followed by a second row of 3 longer ones; 2 more bristles are situated in front of the comb, whilst a very long one is placed about halfway between the insertion of the maxillary palpus and the anterior row of bristles. The occiput bears 3 rows of bristles. The rostrum is about one-third shorter than the fore coxa.

**Thorax.**—The pronotum bears one row of bristles and a comb of 21 spines. The meso- and metanotum have each 3 rows of bristles, the anterior row being incomplete. The episternum of the metathorax has no bristles, while the epimerum bears 6 long ones (3, 3) and 1 or 2 short ones.

**Abdomen.**—The tergites bear 2 rows of bristles, there being one or more additional bristles in front representing a third row. The second tergite has one or two slender, bristle-like spines on each side at the apical edge. The seventh tergite bears 1 apical

bristle, which is short, being about as long as the third post-medial bristle of this segment. The sternites of segments 3 to 7 have a row of 4 long bristles on each side, the basal sternite, however, bearing but 1 bristle.

**Legs.**—The mid and hind coxæ are rather narrow and long, both having a single bristle posteriorly at the apex. There are no short spines on the inside of the hind coxa. The fore-femur has on the outside 1 subapical bristle and 4 or 5 lateral ones. The mid and hind femora bear 2 subapical bristles on the outside and 1 on the inside. There are about 18 bristles on the outer surface of the hind tibia. The hind tibia has 7 dorsal notches. The longest dorsal bristle of this tibia is hardly twice as long as the tibia is broad, the longest apical bristle being only about one-third the length of the first hind tarsal-segment. The tibiae have a long and a short bristle in most of the notches. The first hind-tarsal segment is nearly as long as the hind tibia, the bristles situated at its posterior side being rather long and very thin. The thick apical bristles of this segment are short, the posterior one being only one-third the length of the second segment and the anterior one being about as long as the first segment is broad. The fifth segment bears in all the tarsi 4 strong lateral bristles and a subbasal pair which are placed on the ventral surface in between the first lateral pair.

**Modified segments.**—♂. The large eighth sternite bears a row of 5 long bristles on the side. The clasper (Pl. XXVIII. fig. 1, Cl.) has a short rounded process (P) bearing two long bristles. There is 1 long bristle at the insertion of the movable process (F). This process is very large, being first narrow and curved upwards and then much widened and curved downwards. It bears a row of long bristles at the ventral edge, a short, broad, and somewhat twisted spine at the tip, an irregular double row of bristles on the side and another row at the dorsal edge, the central bristles of this dorsal row being flattened and lanceolate. The manubrium (M) is widest at the apex. The ninth sternite (IX. st.) is likewise very peculiar. The internal (=vertical) arm is broadened at the apex, this widened portion being excised in the usual way, as shown in the figure. The horizontal arm has an almost straight dorsal margin, while the ventral margin is curved, being evenly rounded in the distal third and bearing here a number of bristles. This sternite has basally a lateral horizontal projection crowned with a very dense brush of long thin bristles, which are curly at the end, and among which is one long thick bristle. Beyond the middle of the ventral margin there are 3 short, hook-like spines, and before the apex a large and a small hooked spine, the large one apparently bifurcating at the apex. The tenth segment is long, the sternite bearing two long apical bristles on each side.

Length: ♂ 3 mm.

We have one ♂ from Temuco, Chile, off *Dromiciops australis*, collected by Mr. D. S. Bullock in November 1906.

*Siphonaptera collected by Mr. M. P. Anderson in Japan in 1904.*  
By the Hon. N. CHARLES ROTHSCHILD, M.A.

(Plates XXX. & XXXI.)

The collection contains five species, of which three are new.

1. CERATOPHYLLUS MELIS Walk. (1856).

*Pulex melis* Walker, Dipt. Brit. p. 5. n. 14 (1856) (off Badger);  
Tasch. Die Flöhe, p. 73. n. 10, t. 2. figs. 15, 15 a, t. 3. fig. 16 (1880)  
(off Badger and Fox).

Five females taken off *Meles anakuma* at Jinrio, Tokushima  
Ken, Shikoku, Japan, on February 17th.

2. CERATOPHYLLUS ARGUS, sp. n. (Plate XXX. fig. 15; Plate  
XXXI. fig. 18.)

This species is closely allied to *C. sciurorum* Schrank (1804)  
and *C. anisus* Rothschild (1907). These insects agree with one  
another in almost every detail of the exo-skeleton except in the  
modified posterior segments of the abdomen.

The rostrum is somewhat longer in the new species than in the  
others mentioned above, reaching to the apex of the trochanter or  
a little beyond.

**Modified segments.**—♂. The eighth tergite bears 4 (some-  
times 5) bristles along the upper edge from the stigma and,  
there being 3 to 5 additional bristles on the lateral surface,  
besides 1 or 2 which are placed near the ventral margin. The  
eighth sternite (Pl. XXX. fig. 15) resembles that of *C. anisus*,  
being much longer than in *C. sciurorum*. The clasper is pro-  
duced into a short obtuse process (Pl. XXX. fig. 15, P), which is  
much broader and more rounded than in the allied forms. The  
finger (F) of the clasper is very slender. The vertical arm of the  
ninth sternite (IX. st.) is curved as in *C. anisus*. The proximal  
portion of the horizontal arm is only slightly dilated, and there  
are less hairs on this dilated part than in *C. anisus*.—♀. The  
seventh sternite of the abdomen (Pl. XXXI. fig. 18) becomes  
narrower distally, the upper edge being incurved before the apex,  
while the apical margin is slightly emarginate. This sclerite is  
as long as it is broad. The eighth tergite resembles that of  
*C. sciurorum*. It bears about 7 small bristles above the stigma  
and 1 long and 2 short ones near the margin below the stigma.  
The apex of this segment is slightly emarginate, there being  
3 bristles at the lower angle of the apex, 3 short but rather stout  
ones proximally to them, 4 along the ventral margin and 4 to 6  
dorsally to these. The stylet is more than three times as long as  
it is broad at the base.

Length: ♂ 2.4 mm., ♀ 4 mm.

We have four ♂ and one ♀, taken off *Petaurista leucogenys*,  
at Mitai, Miyasaki Kiushiu, Japan.

## 3. CERATOPHYLLUS INDAGES, sp. n. (Pl. XXXI. fig. 17.)

We know only the ♀. The differences from the ♀ of the preceding species are apparently constant, though slight. This flea is deeper brown than the preceding one. The seventh abdominal sternite is longer, its upper margin being even more emarginate distally, while the apical margin is not sinuate at all (Pl. XXXI. fig. 17).

Length: ♀ 3.1 mm.

We have six ♀, taken off *Sciurus vulgaris orientis*, at Noboribetsu, near Moruran, Hokkaido, Japan.

As the differences between the females of closely allied species in this group of *Ceratophyllus* are generally slight (quantitatively), we consider that the above-mentioned characters indicate that this insect is distinct from *C. argus*. The discovery of the ♂ will doubtless settle the point.

## 4. CERATOPHYLLUS ANDERSONI, sp. n. (Plate XXXI. fig. 19.)

**Thorax.**—The meso- and metanotum and the abdominal tergites 1-7 bear each 2 rows of bristles, the mesonotum having some additional hairs on the back besides the small hairs situated at the anterior edge. The metathoracic epimerum has 5 bristles (1, 3, 1). The long apical bristle of the seventh tergite is as long as the first hind-tarsal segment.

**Legs.**—The hind femur bears 2 bristles on the inner surface, one being subbasal, the other placed subventrally near the apex. The first mid-tarsal segment is about one-fourth longer than the second (20:16). The bristles situated at the dorsal edge of the hind tibia and at the anterior and posterior edges of the hind tarsus are very deep brown. The first hind-tarsal segment, like the second to fourth segments, bears 2 rows of bristles on the outer surface.

**Modified segments.**—♀. The seventh abdominal sternite is quite unlike that sclerite of the allied species, being less broad vertically and much more rounded (Pl. XXXI. fig. 19). The eighth tergite bears a few more bristles than in the preceding species. The bristles of the tenth sternite are very stout. The stylet is four times as long as it is broad at its base.

Length: ♀ 3.1 mm.

We have one ♀, taken off *Putorius itatsi*, at Takamori, Kumamoto Ken, Kiushiu, Japan, on April 6th.

## 5. CHÆTOSYLLA GLOBICEPS Tasch. (1880).

*Pulex globiceps* Taschenberg, Die Flöhe, p. 66. n. 6, t. 2. figs. 10 10 a, 11 (1880) (off Fox and Badger).

There are five ♀ in the collection, which are apparently identical with European specimens. Taken from *Meles anakuma*, at Jinrio, Tokushima Ken, Shikoku, Japan, on February 17th.

## EXPLANATION OF THE PLATES.

## PLATE XXVIII.

- Fig. 1. Genitalia of the ♂ of *Ctenopsyllus allophylus*. Cl = clasper; P = process of clasper; F = movable process of clasper; M = manubrium; VIII. st. = eighth abdominal sternite; IX. st. = ninth abdominal sternite.
2. Head of *Ctenopsyllus allophylus* ♂.
  3. Genitalia of the ♂ of *Ctenophthalmus rettigi*.
  4. Seventh and eighth abdominal segments of *Ctenophthalmus rettigi* ♀.
  5. Sixth and seventh abdominal sternites of *Pygiopsylla rainbowi* ♀.
  6. Genitalia of the ♂ of *Pygiopsylla mordax*.

## PLATE XXIX.

- Fig. 7. Head of *Pygiopsylla afer* ♀.
8. Seventh abdominal sternite of *Pygiopsylla afer* ♀.
  9. The same of *Pygiopsylla mordax* ♀.
  10. The same of *Pygiopsylla lacinosus* ♀.
  11. The same of *Pygiopsylla ferinus* ♀.
  12. Genitalia of the ♂ of *Stephanocircus jarvisi*.

## PLATE XXX.

- Fig. 13. Genitalia of the ♂ of *Pygiopsylla rainbowi*.
14. The same of the ♂ of *Pygiopsylla gravis*.
  15. The same of the ♂ of *Ceratophyllus argus*.

## PLATE XXXI.

- Fig. 16. Posterior abdominal segments of *Stephanocircus jarvisi* ♀.
17. Seventh abdominal sternite of *Ceratophyllus indages* ♀.
  18. The same of *Ceratophyllus argus* ♀.
  19. The same of *Ceratophyllus andersoni* ♀.

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June 16, 1908.

Dr. HENRY WOODWARD, F.R.S., Vice-President,  
in the Chair.

The Secretary read the following report on the additions made to the Society's Menagerie during the month of May 1908:—

The number of registered additions to the Society's Menagerie during the month of May was 189. Of these 116 were acquired by presentation and 46 by purchase, 15 were received on deposit, 4 by exchange, and 8 were born in the Gardens.

The number of departures during the same period, by death and removals, was 175.

Among the additions special attention may be directed to:—

One Black-faced Chimpanzee (*Anthropopithecus troglodytes*), var. ♀, from Sierra Leone, deposited on May 30th.

One Agile Gibbon (*Hylobates agilis*) ♂, from Sarawak, presented by the Earl of Crawford, K.T., F.Z.S., on May 8th.

Three Grèvy Zebras (*Equus grevyi*) ♂, ♀ ♀, from Abyssinia, purchased on May 9th.

Twenty-one Indian domestic Cattle (*Bos indicus*), representing five different breeds, and 5 Fat-rumped Dumba Sheep (*Ovis aries*), from India, presented by H.G. the Duke of Bedford, K.G., President of the Society, on May 13th.

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